**Investigation 9.1 – Translations**

1. State two (2) observations about translations:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Circle the things about the figure that change:

* + Shape
  + Size
  + Position
  + Direction
  + Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do you think those things changed? Why didn’t the other things change?

3. Pick a point on your original figure.

Find where that point matches up (corresponds) on the new image.

Measure that distance.

Does the same thing happen with other points?

4. Determine a solid, thorough, mathematically precise definition for a translation. **You must INCLUDE AND USE an image** in your definition.

**Investigation 9.2 – Rotations**

1. State two (2) observations about rotations:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Circle the things about the figure that change:

* + Shape
  + Size
  + Position
  + Direction
  + Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do you think those things changed? Why didn’t the other things change?

3. Record your findings from step 5 below. What happened, and why?

4. Record your findings from step 6 below. What happened, and why?

5. Determine a solid, thorough, mathematically precise definition for a rotation. **You must INCLUDE AND USE an image** in your definition.

**Investigation 9.3 – Reflections**

1. State two (2) observations about reflections:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Circle the things about the figure that change:

* + Shape
  + Size
  + Position
  + Direction
  + Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do you think those things changed? Why didn’t the other things change?

3. Record your results from step 4 below. What happened? Why do you think this is happening?

4. Determine a solid, thorough, mathematically precise definition for a reflection. **You must INCLUDE AND USE an image** in your definition.

**Investigation 9.5 – Two Reflections Over Parallel Lines**

1. State two (2) observations about what happened:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Circle the things about the figure that change:

* + Shape
  + Size
  + Position
  + Direction
  + Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do you think those things changed? Why didn’t the other things change?

3. Once you finish step 4, answer these questions:

* How does the original shape compare with its second reflected image?
* Is there a single transformation that could have been done to the original figure to get to the final image? (without doing 2 reflections) *Which transformation, and why?*

**Investigation 9.6 – Two Reflections Over Intersecting Lines**

1. State two (2) observations about what happened:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Circle the things about the figure that change:

* + Shape
  + Size
  + Position
  + Direction
  + Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do you think those things changed? Why didn’t the other things change?

3. Answer the questions under step 5 here:

4. Write PPC #66 here – copy the statement and fill in the blanks based on what you saw happen:

**Investigation Wrap-up**

Write solid, mathematically precise comparisons:

* What’s similar between the two?
* What’s different about the two?

You must include and use 1-2 pictures in each response.

**Rotation vs. Reflection**

**Reflection vs. Translation**

**Translation vs. Rotation**

**Translation, then another translation vs. Reflection, then another reflection**